

REMARKS

The application has been amended to place it in condition for allowance at the time of the next Official Action.

Claims 1, 4-29 and 31 were previously pending in the application. Claims 17-29 are cancelled and new claims 32-35 are added. Therefore, claims 1, 4-16 and 31-35 are presented for consideration.

Claim 1 is amended in a manner that is believed to obviate the claim objection.

Amending claims 4 and 8 to depend from claim 1 is believed to address the 35 U.S.C. § 112, second paragraph rejection and withdrawal of the same is respectfully requested.

Claims 1, 4-6, 8-11, 13-16 and 31 were rejected under 35 U.S.C. § 103(a) as being unpatentable RICHARDS-KORTUM et al. (US Patent 6,370,422) in view of IRION et al. (US Patent 6,390,978) and further in view of CANE et al. (US Publication 2001/0056237 A1). That rejection is respectfully traversed.

Claim 1 is amended to clarify how cartilage thickness is determined using the device of claim 1 and recites in part that a signal processor is arranged to determine the cartilage thickness based on light absorption of cartilage and underlying bone at a plurality of wavelengths and based on the intensity of the back-scattered light at the wavelengths.

Claim 31 is amended along the same lines and recites determining a relationship between the intensity of the back-scattered reference light and the intensity of the back-scattered measurement light; and deriving cartilage thickness based on the determined relationship and based on light absorption and light scattering properties of cartilage and underlying bone. Support for the claims can be found in original claim 3 and on paragraphs [0028] and [0044] including Table 1 of the published application.

None of the cited references relates to the thickness measurements of cartilage as recited in claims 1 and 31.

Rather, RICHARDS-KORTUM relates to a system comprising a transmitter and a receiver arranged to receive reflected light. There are no other similarities with the present invention as defined in the independent claims. For example, RICHARDS-KORTUM relates to transmission and detection of received radiation at one wavelength forming images having a depth determined by the focal plane of the confocal imaging apparatus. Thus, light is detected from a given volume (see column 9 lines 64-65).

RICHARDS-KORTUM does not relate to use of spectral measurements (plural wavelengths) for thickness determination. In addition, RICHARDS-KORTUM does not relate to utilization of light absorption for a first layer of one type (cartilage) and the light absorption of an underlying layer of another type (bone) for thickness determination of the first layer.

IRION relates to an imaging method. Depth information is obtained about tissues by means of ultrasonic echo pulses.

Axial resolution is improved by combining ultrasonic with a known optical method (OCT). OCT is based on interference (not absorption) of light of a single wavelength (not spectral measurement).

Thus, IRION does not relate to use of spectral measurements for thickness determinations. In addition, IRION does not relate to utilization of the light absorption for a first layer of one type (cartilage) and the light absorption of an underlying layer of another type (bone) for thickness determination of the first layer as required by claims 1 and 31.

CANE discloses a device for monitoring a presence of one or more chromophores in tissue, especially epithelial tissue. Such device is used to measure tissue color. CANE does not determine thickness of a cartilage layer covering bone.

Rather, as set forth above, CANE is directed to skin color measurement and indeed, any mention of thickness in CANE is with respect to thickness of skin layers.

CANE does not relate to utilization of light absorption for a first layer of one type (cartilage) and the light absorption of an underlying layer of another type (bone) for thickness determination of the first layer.

The above noted features are missing from each of references, are absent from the proposed combination of references and thus, the proposed combination of references does not meet claims 1 and 31.

Moreover, none of the references suggest translating color into a thickness value. Thus, absent impermissible hindsight reasoning, there is no logical connection between the color determination of CANE and the thickness determination of the present invention that would lead one of ordinary skill in the art to the presently recited invention.

The dependent claims are believed to be patentable at least for depending from allowable independent claim.

Canceling claim 17 is believed to obviate the rejection of claims 17-21, 23-27 and 29 under 35 USC 103(a) as being unpatentable RICHARDS-KORTUM et al. in view of IRION et al. and further in view of CANE et al. and further in view of BACKMAN (US Patent 6,624,890).

Claims 7, 12, 22 and 28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over RICHARDS-KORTUM et al. in view of IRION et al. and further in view of CANE et al. and further in view of BACKMAN and still further in view of KANEKO et al. (US Patent 5,305,759). The rejection is respectfully traversed.

KANEKO is only cited with respect to the features of claims 7, 12, 22 and 28. KANEKO does not overcome the shortcomings of RICHARDS-KORTUM/IRION/CANE/BACKMAN as set forth above with respect to claim 1. Since claims 7 and 12 depend from claims 1, these claims are believed to be patentable at least for depending from allowable independent claim.

New claims 32-35 correspond to previous claims 13 and 15, but dependent from claims 8 and 10.

In view of the present amendment and the foregoing remarks, it is believed that the present application has been placed in condition for allowance. Reconsideration and allowance are respectfully requested.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future submissions, to charge any deficiency or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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